

**BUTTS  
TPM 20948 RPL<sup>1</sup>  
HYDROLOGY & HYDRAULIC REPORT  
LOG NO. 05-02-021  
REVISED 1/24/07**

Prepared by:

Hadley Johnson  
RCE 14870  
11/16/2005  
WO 8501B  
Revised 1/27/07



BUTTS  
Drainage Study  
TPM 20948

The project being 2.1 acres will have an insignificant impact on erosion, siltation, hydraulics, flooding, runoff on/off site and impact in runoff due to the new development (pre development vs. post development). The project is located on the divide between the Bonsall H.S.A. and the Upper Ysidora H.S.A. with approximately 1 acre drainage to each H.S.A.

The northerly 1 acre area will flow toward Alvarado Street and the southerly 1 acre portion toward Debra Ann Drive. The attached preliminary grading plan shows the proposed drainage pattern.

The increase flow for the 100 yr storm will be 0.5 cfs and 0.6 cfs.

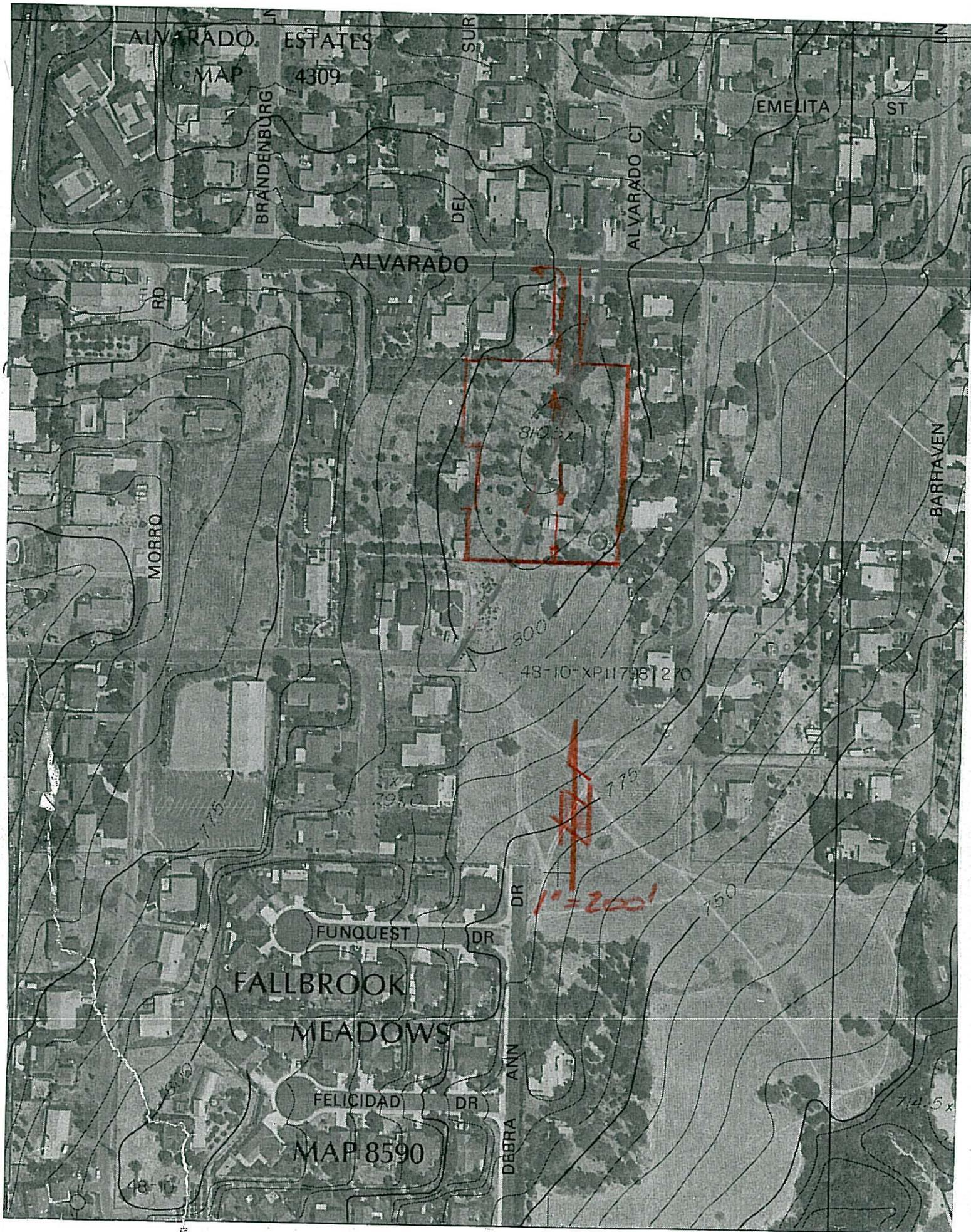
The drainage to the north will flow northerly along Street "A" to Alvarado Street and then westerly along Alvarado Street. The majority of this flow originates within upper Ysidora HSA and stays within the upper Ysidora HSA.

The increase flow to the north (Alvarado Street) will also be mitigated by proposed bio filters along the east side and west side of the proposed access road (Street "A").

The southerly 1 acre area will flow southerly along Street "A" 200 ft. +/- and flow to Debra Ann Drive across the existing access easement per document recorded May 30, 1989 as File No.89-283174.

Again, the majority of this flow originates in the Bonsall HSA and stays within the Bonsall HSA. The minor diversion southerly to Debra Ann Drive less than 1 acre will allow the flow to be carried within the existing roadway which is more than adequate to handle the small flow.

This flow will be mitigated by proposed bio filter to be constructed next to the cul-de-sac east and west side.



# PRELIMINARY GRADING PLAN

## REPLACEMENT TENTATIVE PARCEL MAP NO. 20948

### LAND DIVISION STATEMENT - OWNER'S CERTIFICATE

I HEREBY CERTIFY THAT I AM THE RECORD OWNER, AS SHOWN ON THE LATEST EQUALIZED COUNTY ASSESSMENT OF THE PROPERTY SHOWN ON THE TENTATIVE PARCEL MAP. ALL OF THE BOUNDARIES OF THE TENTATIVE PARCEL MAP ARE SHOWN ON THE BASIS OF CORNER RECORDS, RECORDS OF THE TENTATIVE PARCEL MAP, FINAL MAP, CERTIFICATE OF COMPLIANCE, RECORDS DEED BEFORE 7/1/79, AS SPECIATED ON THE TENTATIVE MAP. I UNDERSTAND THAT PROPERTY IS CONSIDERED CONTIGUOUS OF-WAY FREEDWAY AS DEFINED IN SECTION 7.5 OF THE STREETS AND HIGHWAY CODES, SHALL NOT BE CONSIDERED AS ROADS OR STREETS.

I FURTHER CERTIFY THAT I WILL NOT BY THIS APPLICATION, GRATE, OR CAUSE TO BE CREATED, OR WILL NOT HAVE PARTICIPATED IN THE CREATION OF, ANY RIGHTS OR INTERESTS IN CONTIGUOUS PROPERTY UNLESS SUCH PARCELS WERE CREATED BY WAIVER SUBORDINATED WITH OR BY THIS CERTIFICATION, THE TERM "PARTICIPATED" MEANS HAVING COOPERATED WITH OR IN AN ASSOCIATION OR PARTNERSHIP FOR THE PURPOSE OF BANCING REAL PROPERTY.

I CERTIFY UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT. EXECUTED THIS \_\_\_\_\_ DAY OF NOVEMBER, 2005, IN FALLBROOK, CALIFORNIA.

LAWRENCE C. BUTTS AND KARLA E. BUTTS, DECLARATION OF TRUST  
 ADDRESS: 1508 BLACK WALNUT DRIVE  
 SAN MARCOS, CA 92078  
 PHONE: (760) 803-1223

LAWRENCE C. BUTTS TRUSTEE  
 KARLA E. BUTTS TRUSTEE

1. COMPLETE TAX ASSESSOR'S NUMBER: 105-513-02  
 2. ABBREVIATED LEGAL DESCRIPTION: A PORTION OF LOTS 7&8, TRACT 132 - SHIPLEY TRACT

3. GENERAL PLAN REGIONAL CATEGORY: COUNTY TOWN  
 4. COMMUNITY/SUBREGIONAL PLAN AREA: FALLBROOK COMMUNITY PLAN  
 5. LAND USE DESIGNATION(S): (6) RESIDENTIAL

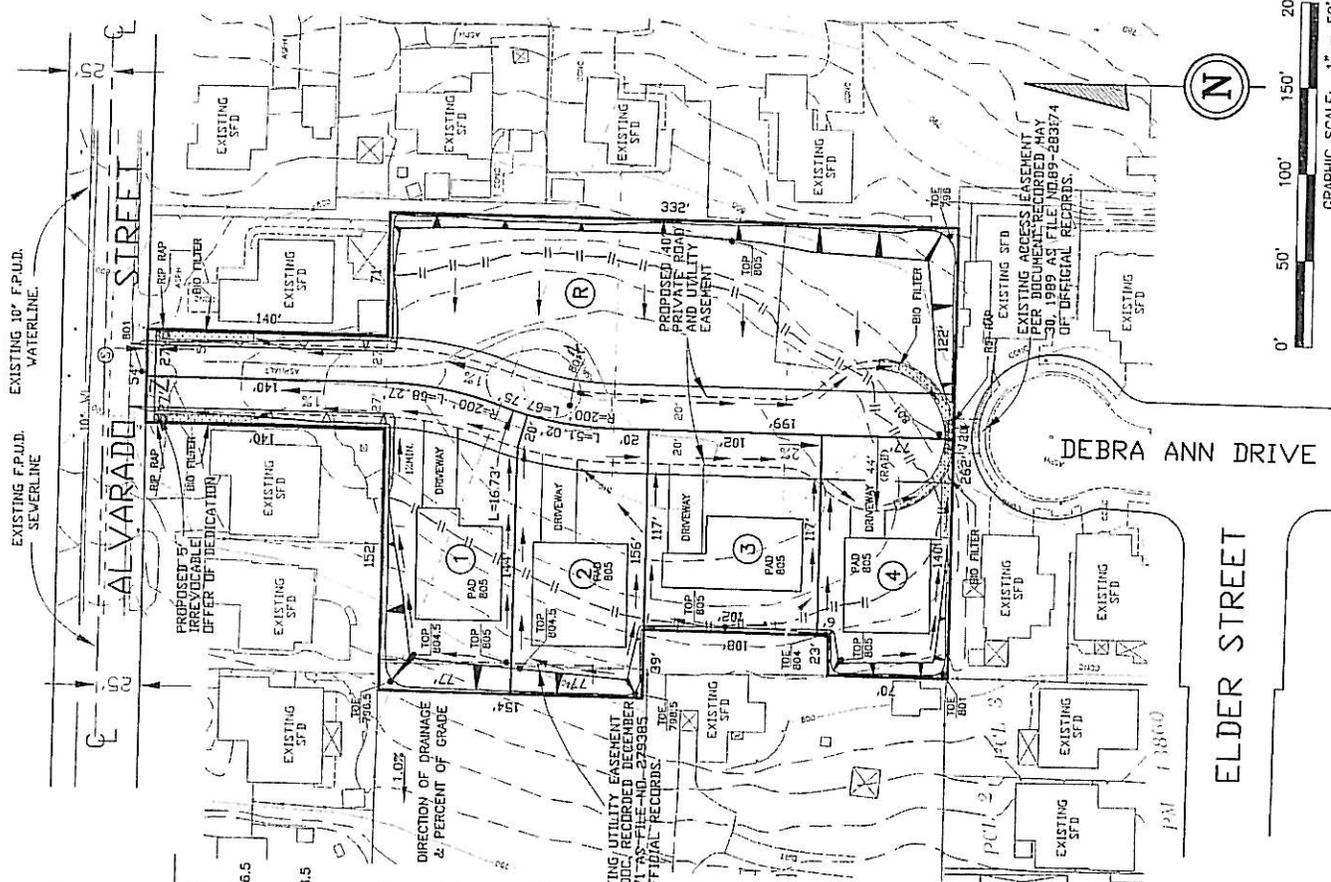
USE REGULATIONS	REGULATIONS
REGULATED REGS	RS-7
LOT SIZE	0
LOT TYPE	6,000 SQ FT
MAXIMUM HEIGHT	C
PER AREA RATIO	G
COVERAGE	G
SETBACK	J
OPEN SPACE	-
SPECIAL AREA REGS	-

6. EXISTING ZONING: RS-7  
 7. GRADING: NONE PROPOSED  
 8. TOPOGRAPHY: AERIAL PHOTOGRAPHY DATED APRIL 1, 2005  
 9. TAX RATE AREA: 75002  
 10. ASSOCIATED PERMITS: N/A

11. LOCATION AND STATUS OF EXISTING LEGAL ACCESS TO SUBJECT PROPERTY FROM A PUBLICLY MAINTAINED ROAD, (i.e. RECORDED EASEMENT, UNRECORDED EASEMENT AND SPECIFY PROPERTY FRONTS PUBLICLY MAINTAINED ROAD KNOWN AS "ALVARADO STREET"

12. WATER SOURCE/ WATER DISTRICT: FALLBROOK PUBLIC UTILITY DISTRICT  
 13. SEWER/SEWER DISTRICT: (SEWER) FALLBROOK PUBLIC UTILITY DISTRICT  
 14. FIRE DISTRICT: NORTH COUNTY FIRE PROTECTION DISTRICT  
 15. SCHOOL DISTRICT: FALLBROOK UNION ELEMENTARY AND FALLBROOK UNION HIGH SCHOOL

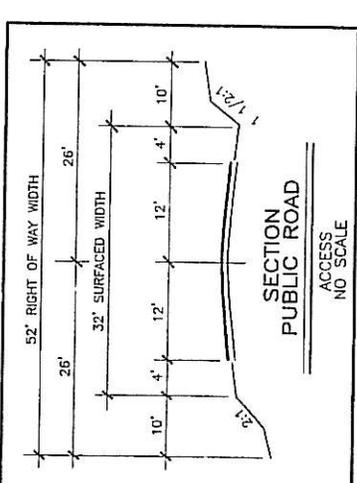
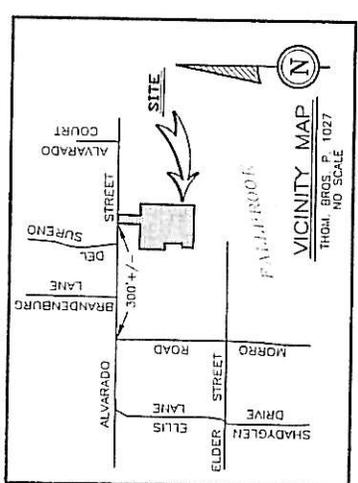
PREPARED BY:  
 W.M. KARN SURVEYING INC.  
 129 WEST FIG ST.  
 FALLBROOK, CA 92028  
 PHONE: (760) 803-1223  
 LS 2361/RCE 14870



**NOTE**  
 THIS PLAN IS PROVIDED TO ALLOW FOR FULL AND ADEQUATE DISCRETIONARY REVIEW OF A PROPOSED DEVELOPMENT PROJECT. THE PROPERTY OWNER ACKNOWLEDGES THAT ACCEPTANCE OR APPROVAL OF THIS PLAN DOES NOT CONSTITUTE AN APPROVAL TO PERFORM ANY GRADING SHOWN HEREON, AND AGREES TO OBTAIN VALID GRADING PERMISSIONS BEFORE COMMENCING SUCH ACTIVITY.

**LEGEND**

YARDAGE QUANTITIES	YARDAGE CUT	YARDAGE FILL
1. 17,320 SQ. FT. GROSS 12,839 SQ. FT. NET	1.5:1 RATIO 600 C.Y. TOP EL=805.0	2.1:1 RATIO 800 C.Y. TOE EL=796.5
2. 12,033 SQ. FT. GROSS 10,554 SQ. FT. NET	500 C.Y. TOP EL=805	700 C.Y. TOE EL=796.5
3. 19,846 SQ. FT. GROSS 9,845 SQ. FT. NET	1000 C.Y. TOP EL=805	50 C.Y. TOE EL=804
4. 10,604 SQ. FT. GROSS 7,796 SQ. FT. NET	200 C.Y. TOP EL=805	600 C.Y. TOE EL=801
DESIGNATED REMAINDER PARCEL R. 42,551 SQ. FT. GROSS 31,678 SQ. FT. NET	1800 C.Y. TOP EL=805	500 C.Y. TOE EL=796



BUTTS TPM 20948  
HYDRAULIC CALCULATIONS

**PRE CONSTRUCTION**

Area 1.0 acres    Westerly portion TPM  
Soil Group C  
Watershed Length 200'  
Watershed Height 25'

$$S = 12\%$$

$$1 \text{ du/ac}$$

$$C = 0.36$$

$$Q_{85} = 0.36(1.6)(1.0) \quad T_c = 1.0 + 6.4$$

$$Q_{85} = 0.58 \text{ cfs} \quad T_c = 7.4$$

$$Q_{100} = 0.36(6.2)(1.0) \quad I_{85} = 1.6 \text{ in/hr}$$

$$Q_{100} = 2.2 \text{ cfs} \quad I_{100} = 6.2 \text{ in/hr}$$

Increase Flow

$$Q_{85} = 0.1 \text{ cfs}$$

$$Q_{100} = 0.5 \text{ cfs}$$

Increase flow will be mitigated by grass lined swale

**POST CONSTRUCTION**

Watershed Length = 400  
Watershed Height = 5'

$$S = 1.25\%$$

$$7.3 \text{ du/ac}$$

$$C = 0.55$$

$$T_c = 4 + 7.4$$

$$T_c = 11.4$$

$$I_{85\%} = 1.33 \text{ in/hr}$$

$$I_{100} = 4.9 \text{ in/hr}$$

$$Q_{85\%} = 0.55(1.3)(1.0)$$

$$Q_{85\%} = 0.72 \text{ cfs}$$

$$Q_{100} = 0.55(4.9)(1.0)$$

$$Q_{100} = 2.7 \text{ cfs}$$

Area Easterly Portion TPM 20948 RPL'  
Area = 1.1 acs.

### PRE CONSTRUCTION

Watershed L = 200'  
Watershed H = 15'

S = 7%

Soil Group C

1 du/ac

C = 0.36

Tc = 1.2 + 7  
Tc = 8.2 mins.

I<sub>85%</sub> = 1.6  
I<sub>100</sub> = 6.0

Q<sub>85</sub> = 0.36(1.6)(1.1)  
Q<sub>85</sub> = 0.63 cfs

Q<sub>100</sub> = 0.36(6.0)(1.1)  
Q<sub>100</sub> = 2.4 cfs

Increase Flow  
Q<sub>85</sub> = 0.16 cfs  
Q<sub>100</sub> = 0.6 cfs

### POST CONSTRUCTION

Watershed L = 300  
Watershed H = 5'

S = 2%

Soil Group C

Future 7.3 du/ac

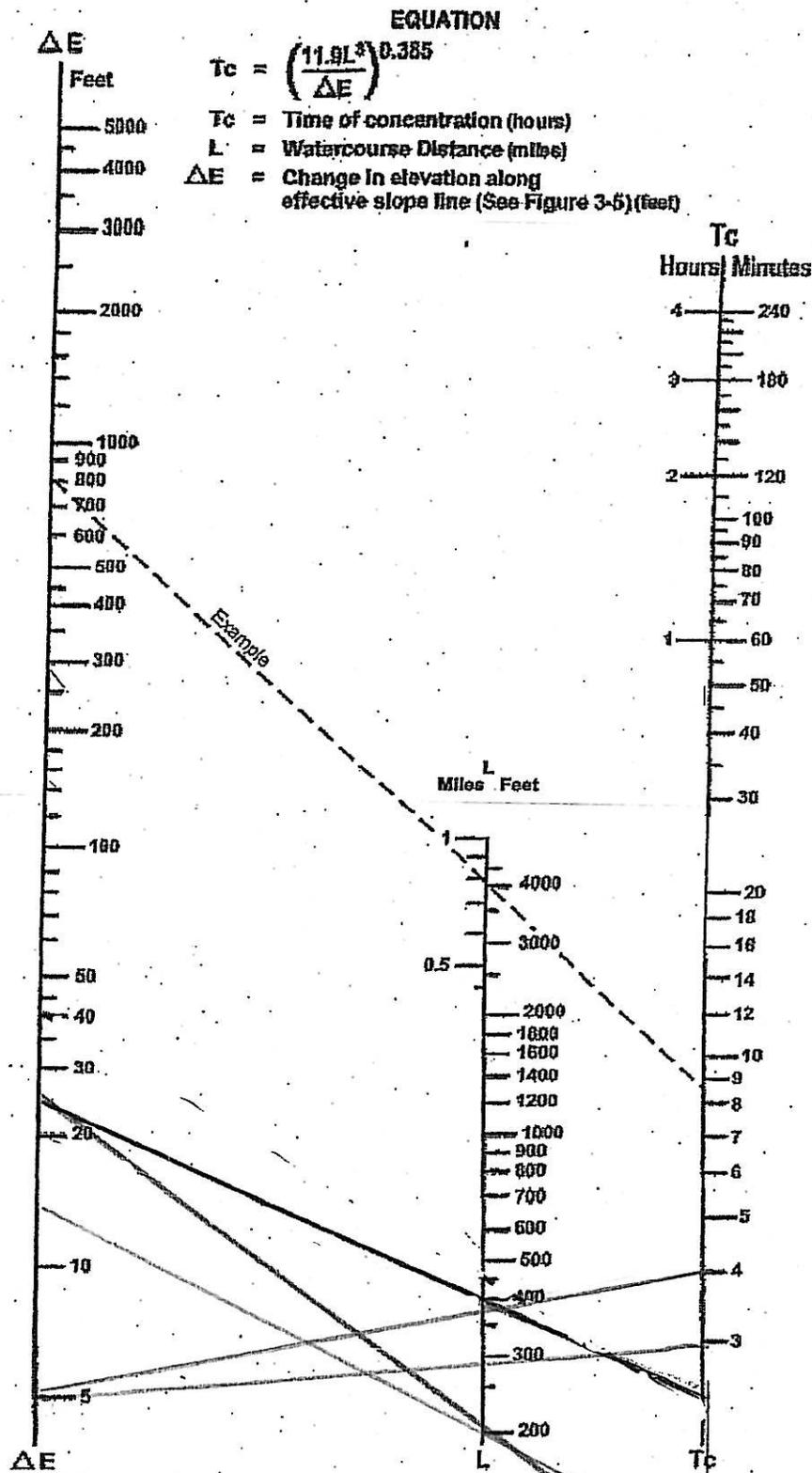
C = 0.55

Tc = 3 + 7.4  
Tc = 10.7

Q<sub>85</sub> = 0.55(1.3)(1.1)  
Q<sub>85</sub> = 0.79 cfs

Q<sub>100</sub> = 0.55(5.0)(1.1)  
Q<sub>100</sub> = 3.0 cfs

Increase flow will be mitigated by grass lined swale



SOURCE: California Division of Highways (1941) and Kirpich (1940)

Nomograph for Determination of  
Time of Concentration ( $T_c$ ) or Travel Time ( $T_t$ ) for Natural Watersheds

FIGURE

**3-4**

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

Table 3-2 provides limits of the length (Maximum Length ( $L_M$ )) of sheet flow to be used in hydrology studies. Initial  $T_i$  values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

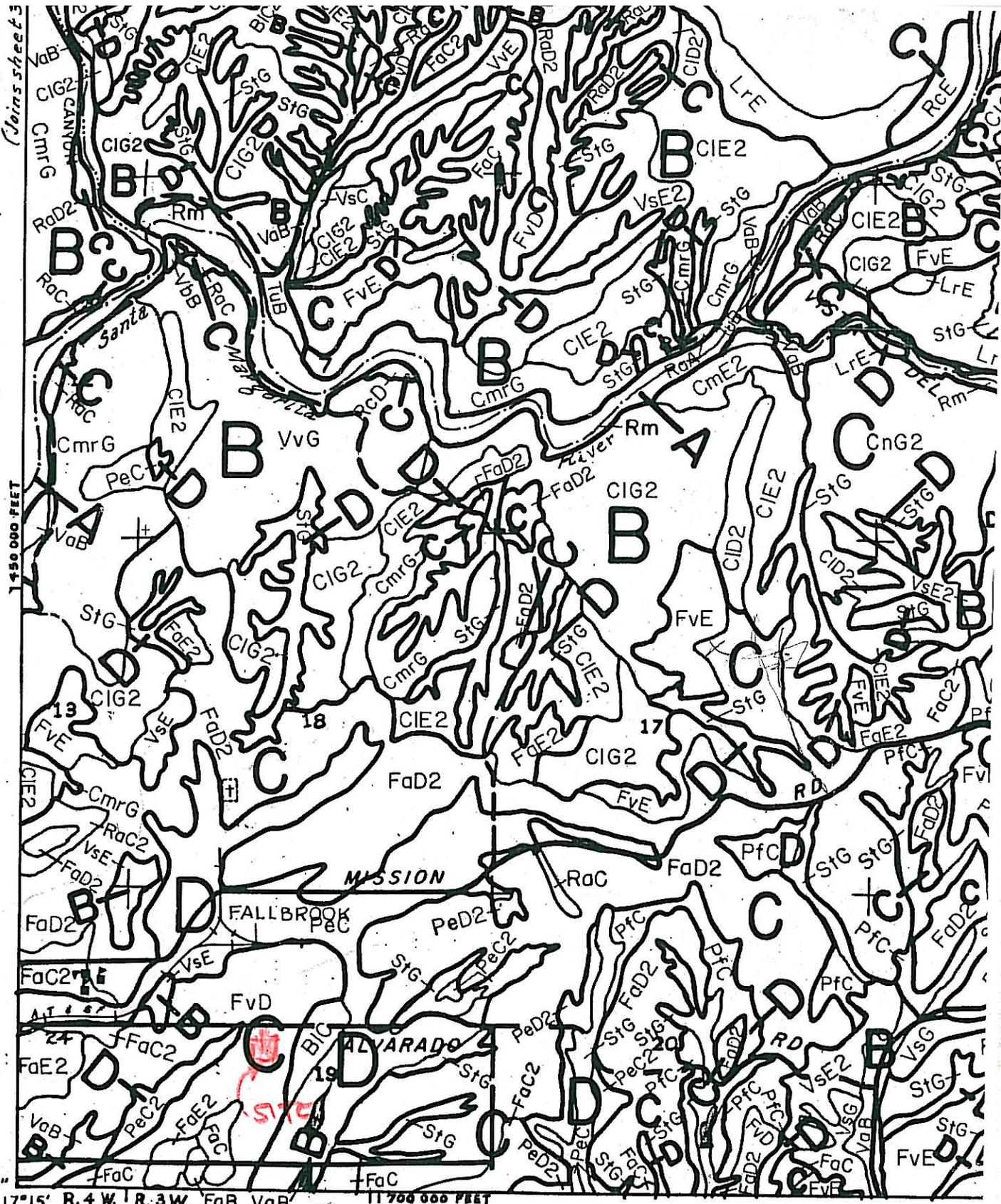
**MAXIMUM OVERLAND FLOW LENGTH ( $L_M$ )  
 & INITIAL TIME OF CONCENTRATION ( $T_i$ )**

Element*	DU/ Acre	.5%		1%		2%		3%		5%		10%	
		$L_M$	$T_i$										
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

\*See Table 3-1 for more detailed description

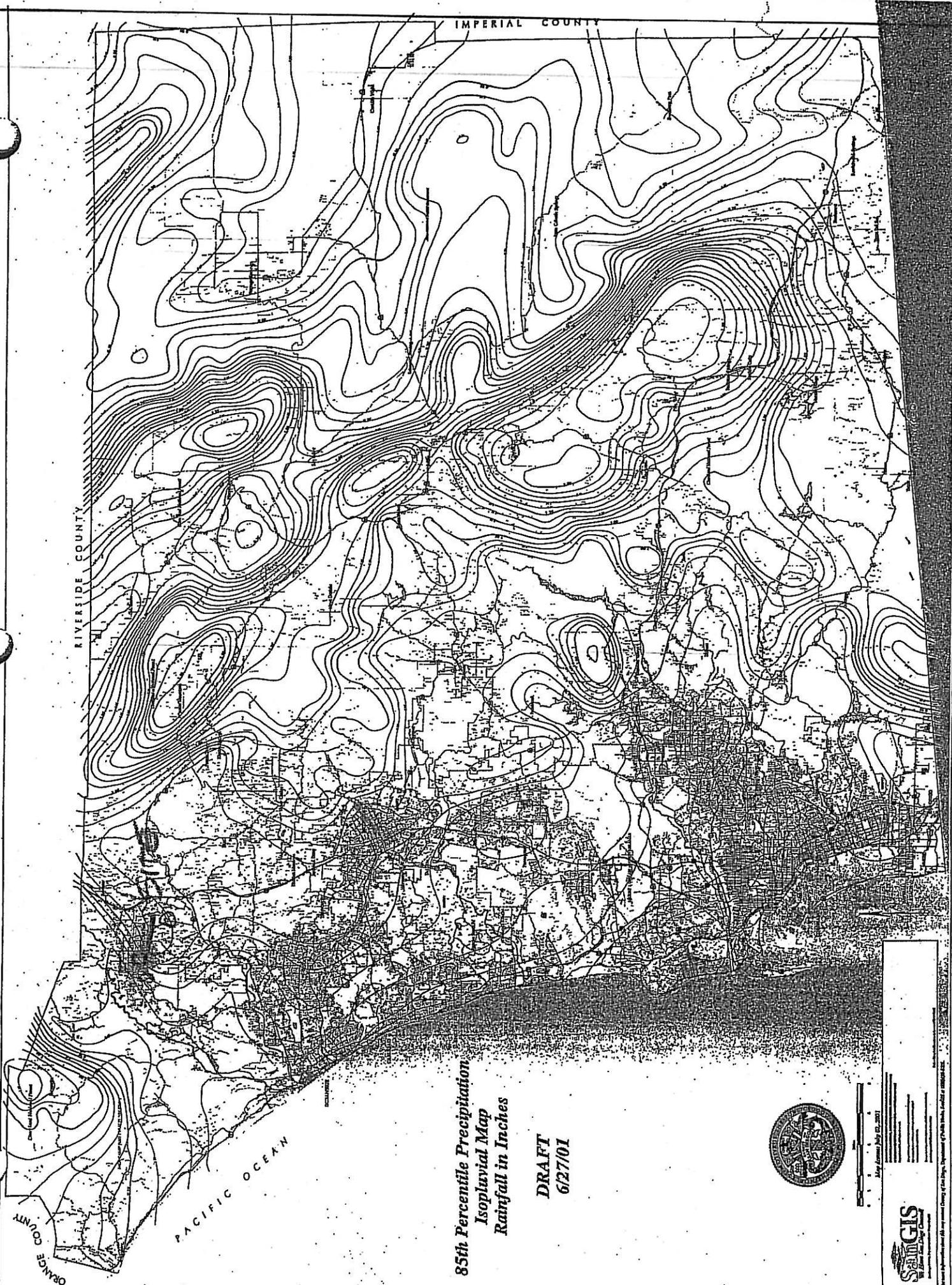


(Joins sheet 3)



33°22'30" 117°15' R. 4 W. 1 R. 3 W. 11,700,000 FEET

San Diego County Soils Interpretation Stud  
**HYDROLOGIC SOIL GROUPS - Runoff Poten**



85th Percentile Precipitation  
Isopluvial Map  
Rainfall in Inches

DRAFT  
6/27/01



Map Datum: NAD 83

STANGLIS  
Geographic Information Systems  
10000 E. Main Street, Suite 100  
Denver, CO 80231  
Phone: (303) 751-1000  
Fax: (303) 751-1001  
www.stanglis.com

# County of San Diego Hydrology Manual



## Rainfall Isophyets

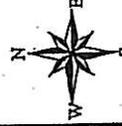
### 10 Year Rainfall Event - 6 Hours

..... Isophyetal (inches)



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3 0 3 Miles



# County of San Diego Hydrology Manual



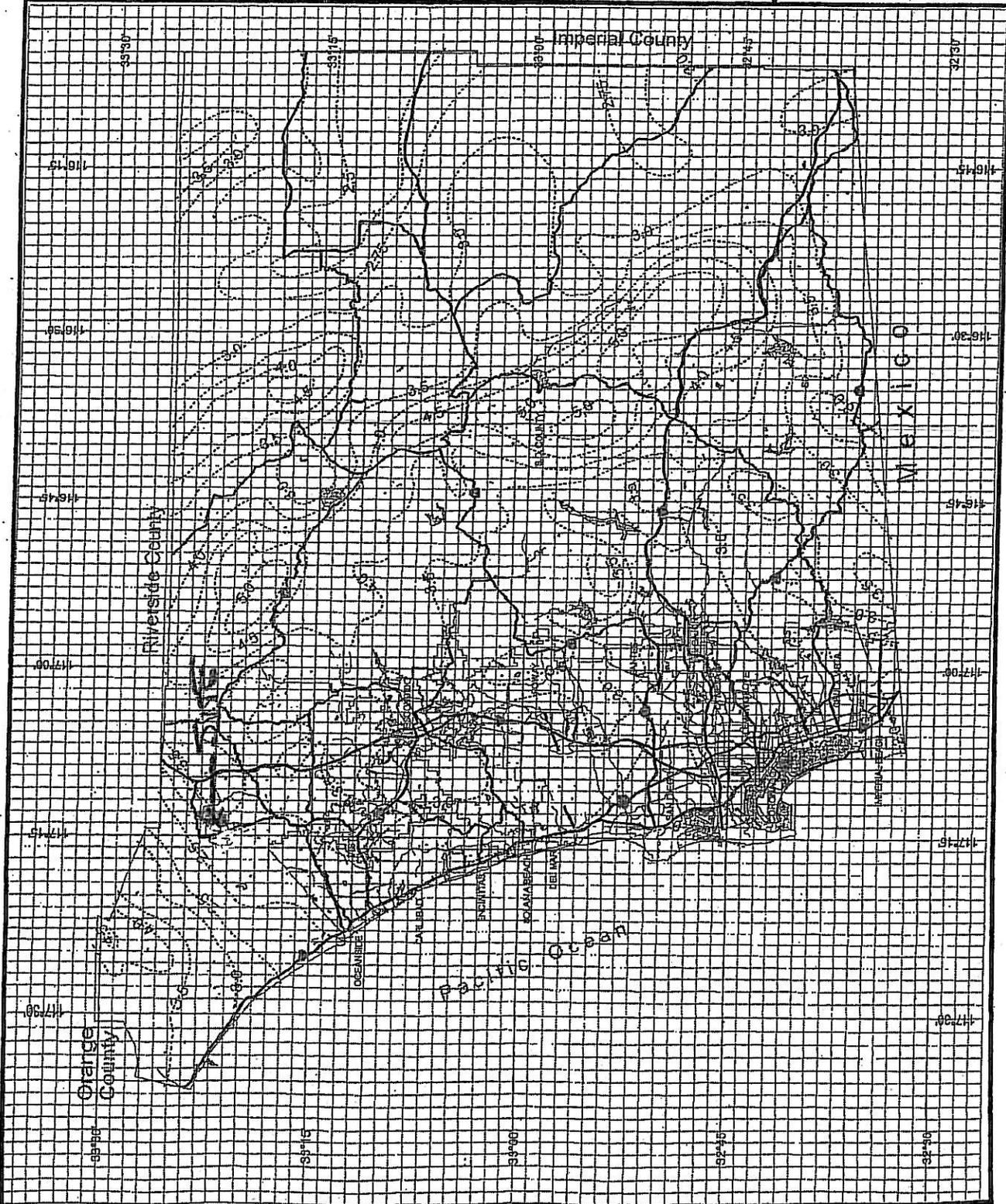
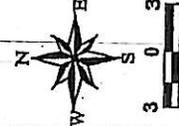
## Rainfall Isoplethals

### 100 Year Rainfall Event - 6 Hours

..... Isoplethial (Inches)



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# County of San Diego Hydrology Manual

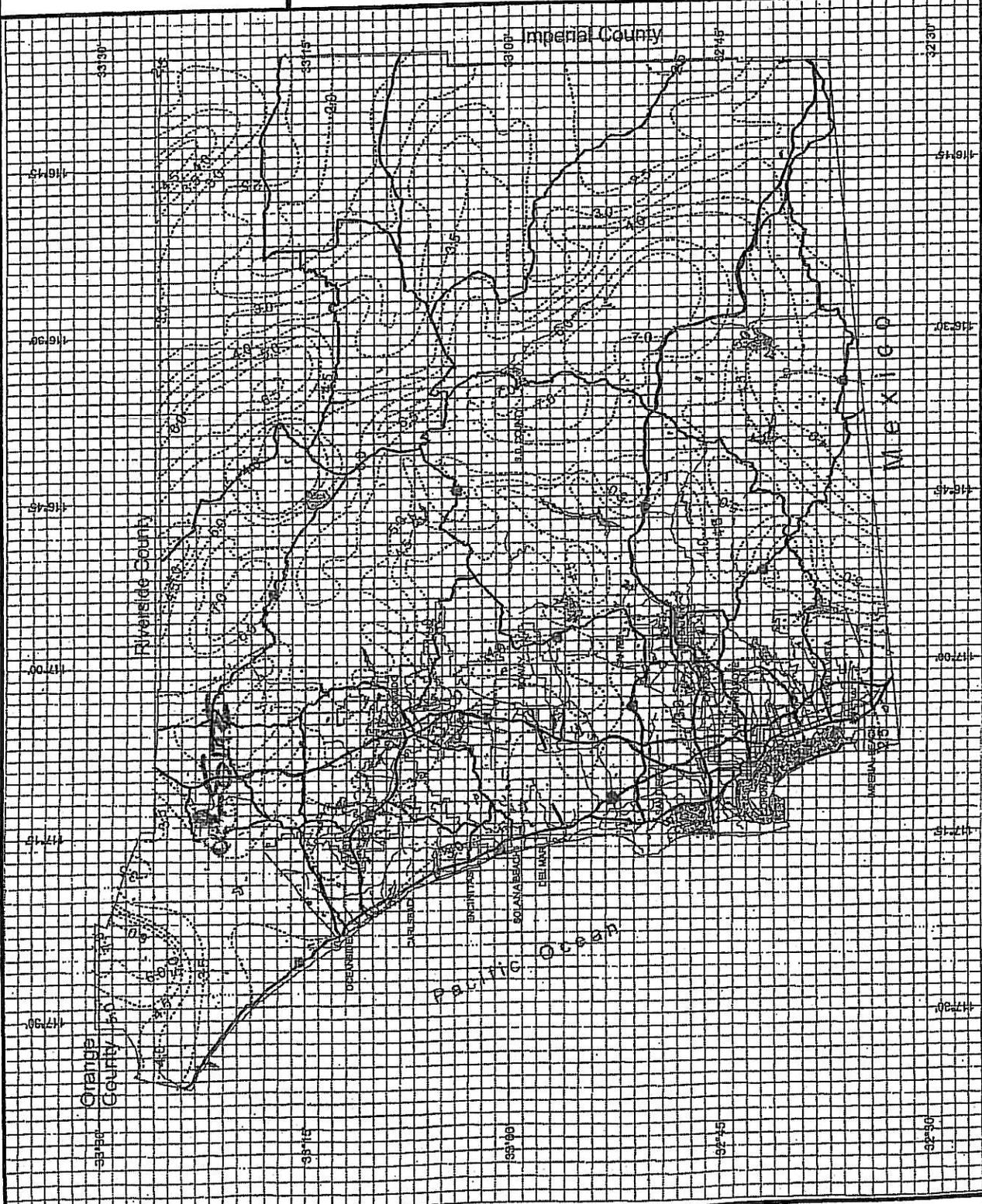
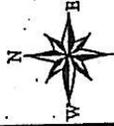


## Rainfall Isohyetals

10 Year Rainfall Event - 24 Hours



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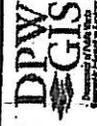
# County of San Diego Hydrology Manual



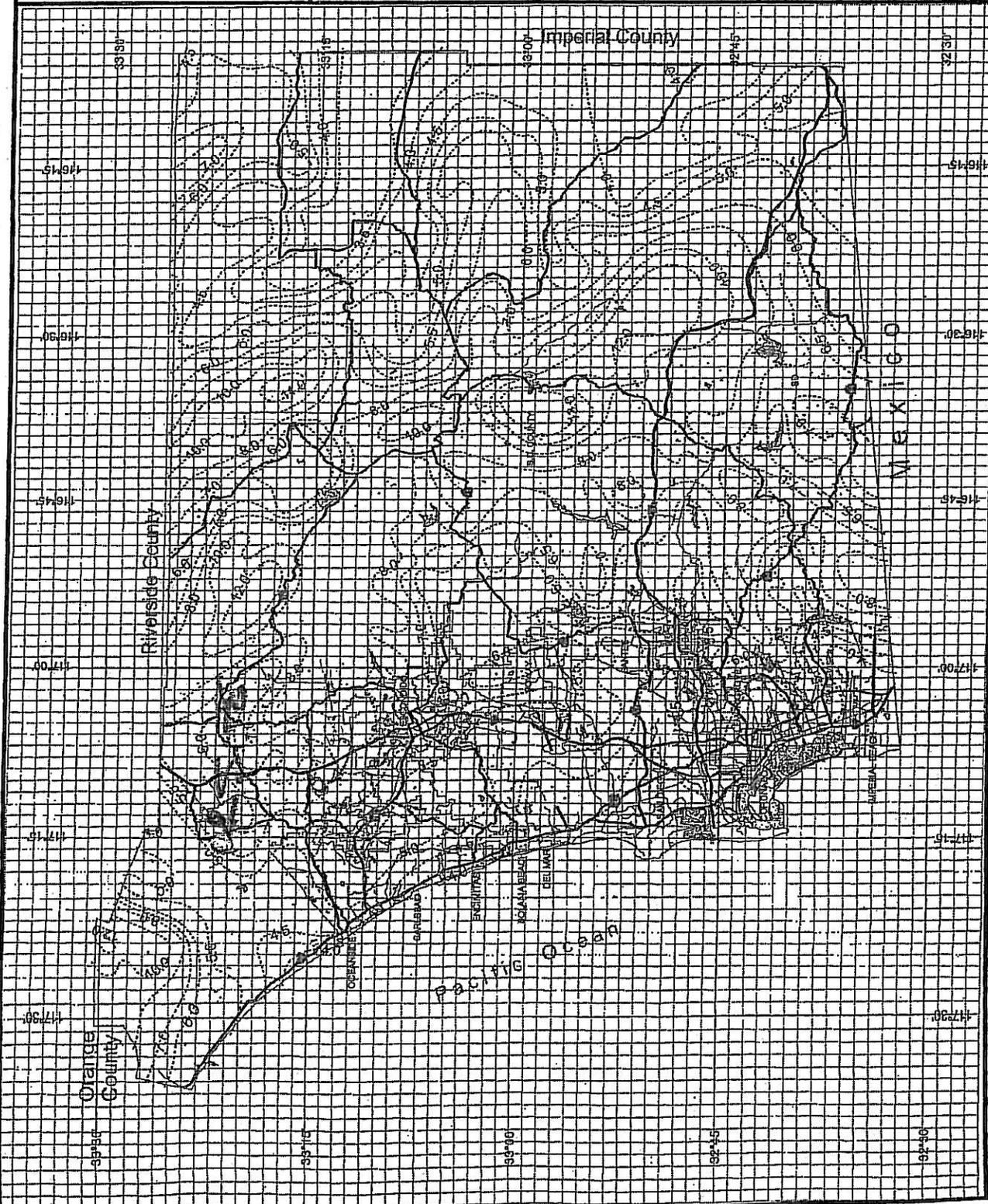
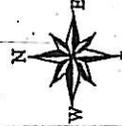
## Rainfall Isopleths

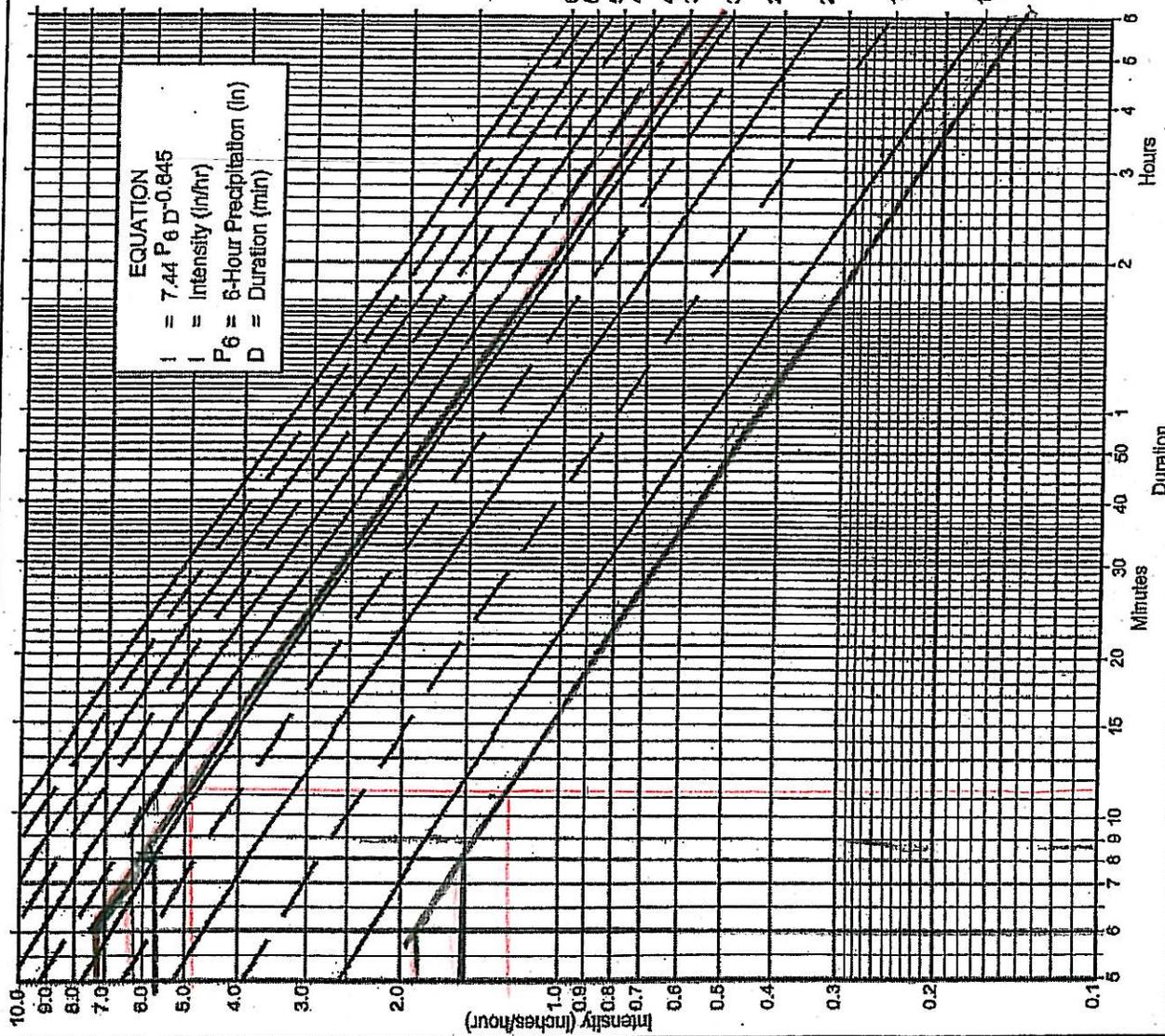
100 Year Rainfall Event - 24 Hours

.....  
Isopleth (Inches)



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6-Hour Precipitation (inches)

**Directions for Application:**

- (1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).
- (2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicable to Desert).
- (3) Plot 6 hr precipitation on the right side of the chart.
- (4) Draw a line through the point parallel to the plotted lines.
- (5) This line is the intensity-duration curve for the location being analyzed.

*85<sup>th</sup> PERCENTILE = 0.75 in/hr*

**Application Form:**

- (a) Selected frequency  $\frac{19}{100}$  year
- (b)  $P_6 = \frac{2.3}{1.52} \text{ in.}, P_{24} = \frac{4.5}{6.0} \text{ in.} = \frac{49}{53} \% (2)$
- (c) Adjusted  $P_6^{(2)} = \frac{2.3}{1.52} \text{ in.}$
- (d)  $t_x = \text{--- min.}$
- (e)  $I = \text{--- in./hr.}$

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	1	1	1	1	1	1	1	1	1	1	1
5	2.53	3.65	5.27	6.59	7.90	9.22	10.54	11.85	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.68	12.75
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.98	2.69	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.58	4.99
40	0.69	1.06	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.78	4.13
50	0.60	0.90	1.19	1.49	1.78	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.04	1.33	1.59	1.85	2.12	2.39	2.65	2.92	3.18
70	0.47	0.71	0.92	1.12	1.29	1.49	1.69	1.84	2.04	2.25	2.45
100	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.28	0.44	0.59	0.78	0.93	1.09	1.18	1.32	1.47	1.62	1.78
180	0.26	0.39	0.52	0.68	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.75	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.76	0.85	0.94	1.03	1.13
350	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

**FIGURE 3-1**

**Intensity-Duration Design Chart - Template**